

THE LESION NEMATODE, PRATYLENCHUS BRACHYURUS,  
INFECTING CITRUS

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Pratylenchus brachyurus (Godfrey, 1929) Filipjev and Schuurmans Stekhoven, 1941, is one of the root lesion nematodes. Lesion nematodes belong to the genus Pratylenchus. They are called lesion nematodes because of the presence of darkened necrotic lesions or patches which appear on the roots as indications of damage caused by the feeding action of the nematodes.

BACKGROUND:

Pratylenchus brachyurus is distributed throughout the warmer regions of the world and is found abundantly throughout the southeastern United States. It is a pest of pineapple, peanut, strawberry, cotton, corn, tobacco, potato, and many other plants. In Florida, at least 78 plants are known to be hosts.

The first published report of lesion nematodes parasitizing citrus in Florida appeared in 1953. At the time, investigations had not been made to determine the pathogenicity of the different species to Florida citrus. Investigations began in 1954. Agricultural and non-agricultural areas of Florida were sampled from Gainesville to Homestead. These areas turned out to be 95% infested with mixed species of lesion nematodes. Another investigation revealed that of 3,649 Florida citrus grove properties from 26 counties, 93% were infested with some species of lesion nematode. Continued investigations revealed that P. brachyurus was the species recovered from citrus groves of Florida more frequently than any other plant parasitic nematode.

Because of the nematodes' close and frequent association with citrus, greenhouse experiments were begun to determine whether P. brachyurus was a pathogen to citrus and if so, to what extent.

SYMPTOMS AND PATHOGENICITY:

Pathogenicity investigations were carried out with sour orange (Citrus aurantium L.) seedlings. Sour orange seedlings which were infected with P. brachyurus showed stunting, reduced foliage, and wilting after 3 weeks of growth. Feeder roots were marred with brownish lesions, and the root systems were reported to be distorted and reduced after 6 months of growth. The damage was evidenced by tunnels and cavities which formed within the cortex. Cellular damage was reported to extend 2-3 cells outward from each side of the nematodes within the roots.

Rough lemon, Citrus jambhiri Lush. [C. limon (L.) Burm. f. 'Rough'], seedlings which were infected with P. brachyurus and grown in soil temperatures from 24-32 C (75.2-89.6 F) manifested weight reductions of 15-44% and 6-35% for roots and tops respectively, as compared to non-infected control plants.

Seedling grapefruit (Citrus paradisi Macf.) which was experimentally infected became stunted with reduced top and root growth. However, variations between individual plants were so great that mean differences between infected and non-infected plants were not considered by the investigator to be statistically significant.

Lemon [Citrus limon (L.) Burm. f.] seedlings which were tested appeared to be only moderately susceptible and additional greenhouse investigations showed no reduction of growth after 6 months.

Citrus may be heavily infected with this nematode but might not readily show symptoms of injury from it. In one test, rough lemon seedlings were inoculated with P. brachyurus. After 58 weeks the nematode population increased to 5 times the original inoculum level, but the seedlings showed no measurable reduction of growth.

Tests and observations have shown that young trees are more adversely affected than trees which are 10 years old or older. It has been observed that trees outgrow and overcome the adverse effects caused by this nematode when the trees are young.

## DISCUSSION AND SUMMARY:

The relatively mild pathogenicity of P. brachyurus to citrus does not negate the necessity for pursuing conscientious nursery sanitation and grove maintenance programs. It has been reported that conditions of the environment, fungi, insects or nutritional imbalance may cause more damage by acting in combination with the nematode than the nematode alone is capable of causing.

Evidence exists which indicates that young trees respond favorably to specific nematicidal treatments.

Pratylenchus brachyurus can survive long periods in dry soil at hot temperatures. At low to zero soil moisture it can survive temperatures as high as 45.5 C (114 F). Consequently, it is capable of dissemination in dry root debris. The ability to withstand a hot dry environment is a key characteristic for the survival of this nematode.

Greenhouse and field investigations reveal that while P. brachyurus is unquestionably a parasite of citrus, it appears to be a relatively weak pathogen to citrus and is not believed to threaten the economics of fruit production.

## SELECTED REFERENCES:

- Brooks, T. L. 1962. The nematode Pratylenchus brachyurus associated with citrus in Florida. M. S. Thesis, Univ. Fla., Gainesville. 19p.
- \_\_\_\_\_. 1964. Pathogenicity of Pratylenchus brachyurus to citrus. Ph. D. Dissertation, Univ. Fla., Gainesville. 51p.
- \_\_\_\_\_, and V. G. Perry. 1967. Pathogenicity of Pratylenchus brachyurus to citrus. Plant Dis. Reprtr. 51(7):569-573.
- Christie, J. R. 1959. Plant nematodes their bionomics and control. Agric. Exp. Sta., Univ. Fla., Gainesville. 256p.
- Corbett, D. C. M. 1976. Pratylenchus brachyurus. C. I. H. descriptions of plant-parasitic nematodes. Set 6, No. 89. Commonwealth Institute of Helminthology, Herts, England.
- Feldmesser, J., W. A. Feder, and J. A. Pinckard. 1956. The occurrence of Pratylenchus spp. in Florida soils. Phytopathology 46(1):11 (Abstr.).
- \_\_\_\_\_, and C. I. Hannon. 1969. Susceptibility of two citrus rootstocks of Pratylenchus spp. Plant Dis. Reprtr. 53(8):603-607.
- \_\_\_\_\_. 1965. An evaluation of the role of Pratylenchus in decline of citrus. Phytopathology 55(10):1058 (Abstr.).
- \_\_\_\_\_, and R. V. Rebois. 1965. Temperature and moisture effects on Pratylenchus brachyurus. Nematologica 11(1):37-38 (Abstr.).
- O'Bannon, J. H., J. D. Radewald, and A. T. Tomerlin. 1972. Population fluctuation of three parasitic nematodes in Florida citrus. J. Nematol. 4(3):194-199.
- \_\_\_\_\_, A. C. Tarjan, and F. W. Bistline. 1974. Control of Pratylenchus brachyurus on citrus and tree response to chemical treatment. Proc. Soil Crop Sci. Soc. Fla. 33:65-67.
- \_\_\_\_\_, and A. T. Tomerlin. 1969. Population studies on two species of Pratylenchus on citrus. J. Nematol. 1(4):299-300 (Abstr.).
- \_\_\_\_\_. 1970. Pratylenchus spp. as citrus pathogens. Phytopathology 6(11):1540 (Abstr.).
- Olowe, T., and D. C. M. Corbett. 1976. Aspects of the biology of Pratylenchus brachyurus and P. zeae. Nematologica 22(2):202-211.
- Radewald, J. D., J. H. O'Bannon, and A. T. Tomerlin. 1971. Temperature effects on reproduction and pathogenicity of Pratylenchus coffeae and P. brachyurus and survival of P. coffeae in roots of Citrus jambhiri. J. Nematol. 3(4):390-394.
- Stokes, D. E. 1972. Parasitism of Pratylenchus spp. to 'Lovell', 'Nemaguard' and 'Okinawa' peach. Ph. D. Dissertation, Univ. Fla., Gainesville. 63p.
- Tarjan, A. C., and J. H. O'Bannon. 1969. Observations on meadow nematodes (Pratylenchus spp.) and their relation to declines of citrus in Florida. Plant Dis. Reprtr. 53(9):683-686.
- Thorne, Gerald. 1961. Principles of nematology. McGraw-Hill Book Co., Inc., New York. 553p.
- Tomerlin, A. T., and J. H. O'Bannon. 1974. Effect of Radopholus similis and Pratylenchus brachyurus on citrus seedlings in three soils. Proc. Soil Crop Sci. Soc. Fla. 33:95-97.